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U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

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5055

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

09/913320

INTERNATIONAL APPLICATION NO.

PCT/EP00/00653

INTERNATIONAL FILING DATE

28 January 2000

PRIORITY DATE CLAIMED

10 February 1999

TITLE OF INVENTION

A Device and a Method for Processing Samples

APPLICANT(S) FOR DO/EO US

Freydl et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest-claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☐ Other items or information:

Docket No. 5055

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the patent application of Freydl

National Phase of PCT/EP00/00653

U.S. Serial No. not yet assigned

Filing date: August 10, 2001

Title: A Device and a Method for Processing Samples

Assistant Commissioner for Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

Please cancel claims 1-12 and replace with new claims 13-24 as on the
attached sheet.

Respectfully submitted,



Charles W. Fallow
Reg. No. 28,946

Shoemaker and Mattare, Ltd.
2001 Jefferson Davis Highway
Arlington, Virginia 22202

(703) 415-0810

August 10, 2001

Preliminary amendment claims for National Phase of PCT/EP00/00653

13. A device for evaporating samples in sample vessels, each of said vessels being provided with at least one filling opening, said device comprising

holding means for simultaneously holding several sample vessels,

connection means connectable to the filling openings, by way of which the sample vessels individually or in groups are hermetically connectable to means for producing a vacuum and thereby may be evacuated.

14. A device according to claim 13, further comprising drive means for producing a vortex movement, said connection means being flexible so that the holding means and the sample vessels are movable independently of the means for producing a vacuum.

15. A device according to claim 13, wherein the connection means comprise at least one connection plate which is sealingly pressable onto the filling openings of the sample vessels, or is suctioned by the vacuum, and which has connection paths for connecting the filling openings to the connection of the means for producing a vacuum.

16. A device according to claim 15, wherein the connection plate comprises longitudinal channels which extend from its lower side, directed towards the sample vessels, of the connection plate and which are placeable aligned onto the filling openings.

17. A device according to claim 16, wherein the longitudinal channels extend through the connection plate up to the upper side distant to the lower side, wherein the upper side is provided with a least one recess which communicates with the longitudinal channels.

18. A device according to claim 17, wherein between the exit opening of the longitudinal channels and the recess there are formed battles which prevent the flowing back of condensate into the sample vessels, and the level of the exit opening lies above the level of the base of the recess.

19. A device according to claim 17, wherein the connection plate comprises a connection opening which communicates with the recess and which is connectable to the means for producing a vacuum.

20. A device according to claim 17, wherein the connection means comprise a sealing plate which for sealing the recess is placeable onto the connection plate.

21. A device according to claim 20, wherein the sealing plate is made of transparent heat-resistant glass.

22. A device according to claim 20, wherein the sealing plate and/or the connection plate comprise aligning means for centering and firmly holding the connection plate with respect to the holding means.

23. A device according to claim 13, wherein the holding means and/or the connection means are adaptable to a differing number and size of sample vessels.

24. A method for evaporating samples simultaneously held in several sample vessels each having a filling opening, said method comprising steps of

hermetically connecting the filling opening of each of the vessels to a means for producing a vacuum,

heating the samples in said vessels, and

evacuating said vessels by means of said vacuum.

A device and a method for processing samples

The invention relates to a device and to a method for processing, in particular evaporating samples, according to the preamble of the independent patent claims.

For evaporating dissolved samples held in sample vessels it is known to heat the sample in the vessel. For reducing the boiling point of the solvent it is known to produce a vacuum in the sample vessel. Thus an evaporation at lower temperatures is possible.

Furthermore it is known to move the sample vessel in order to produce swirl in the dissolved sample. The evaporation rate of the solvent is increased by way of this.

It is desirable in an evaporation vessel to be able to process several different samples simultaneously.

Form CH 688 987 there is for example known a reaction chamber into which several sample vessels may be simultaneously placed. The reaction chamber may be placed under a vacuum. The sample vessels are placed in a movable rack which may be driven from the outside via a magnet coupling.

This device however has the disadvantage that complicated mechanisms for driving and heating the sample vessels held in the closed chamber must be provided.

From US 5 569 357 there is likewise known an evaporator with which in the sample solutions a swirl is produced. Also in this device several sample vessels are arranged in a common space.

With all these known devices there exists the problem that the samples in individual sample vessels (which may be of a different nature) may mix via the gaseous phase. The purity of the end product is thus no longer guaranteed.

It is therefore the object of the present invention to avoid the disadvantages of the known, in particular to provide a device and a method for processing, in particular evaporating, which in a simple manner permits the processing, in particular evaporation of several samples held in various sample vessels. The method and the device are to effectively prevent a mixing of the samples via the gaseous phase, are to be simply manufacturable and operable and are to be adaptable in a simple manner to the varying requirements.

According to the invention these objects are achieved with a device and with a method according to the features of the characterising part of the independent patent claims.

The object with the features of the invention serves for processing samples which are contained in sample vessels. The sample vessels comprise at least one filling opening through which the sample may be given into the sample vessel. In particular the device serves for evaporating the samples.

The device comprises holding means for the simultaneous holding of several sample vessels. The holding means are typically designed as a rack. The usually roughly cylindrical sample vessels (tubelets closed at the bottom) are placed into the rack.

The device furthermore comprises optional heating means for heating the sample contained in the sample vessels. The heating means consist typically of a normal heating plate. With certain

solvents with a low boiling point a heating is not necessary. Evaporation is effected alone on account of the vacuum.

The device is furthermore provided with means for producing a vacuum. Basically all means are suitable which may produce a sufficiently large vacuum. Here and in the following the term vacuum pump is to be understood as all means which may produce such a vacuum.

According to the invention the device comprises connection means by way of which the sample vessels individually or in groups are gas-tightly connectable to a connection of the vacuum pump and by way of this can be evacuated. This design of the connection means comprises several advantages.

Firstly by way of the gas-tight connection of the sample vessels to the vacuum pump a mixture of the samples via the gaseous phase may be prevented. The sample vessels are in principle closed and communicate directly with the vacuum pump.

Secondly the rack and the sample vessels are directly accessible. Since these are not arranged in a closed space, it is possible to directly heat or drive these.

In a preferred embodiment example the device comprises drive means for producing a vortex movement (vortex movement is to be understood as a movement which in the sample vessels produce the desired swirl). The connection means are with this simultaneously designed in a manner such that the holding means and the sample vessels are movable independently of the vacuum pump. In particular the connection means comprise flexible components.

In a further particularly simple embodiment example the connection means comprise at least one connection plate. The connection plate is sealingly pressable onto the filling openings of the sample vessels. Because in the sample vessels there prevails a vacuum there are not necessary any particular provisions for pressing on the connection plate. The pressing plate is sealingly suctioned on. The connection plate is provided with connection paths which serve for connecting the filling openings to the connection of the vacuum pump. So that a sealing connection is guaranteed between the connection plate and the filling openings of the sample vessels there are advantageously arranged sealing means. The sealing means may be exchangeable. Contaminated seals may in this manner be simply exchanged.

The connection plate may in particular comprise longitudinal channels which extend from the lower side, able to face the sample vessels, of the connection plate roughly at right angles to the lower side. The longitudinal channels may be placed on aligned to the filling openings.

The longitudinal channels are connectable via the connection paths to the connection of the vacuum pump. By way of a simple placing of the connection plate onto the filling openings of the sample vessels these are connected to the vacuum pump in a gas-tight manner. A mixing of the samples via the gaseous phase outside the sample vessels is therefore effectively avoided.

In a particularly simple embodiment example the longitudinal channels extend transversely through the connection plate, that is to say up to the upper side distant to the lower side of the connection plate. The connection paths in the connection plate are at the same time formed by deepenings on the upper side. The deepenings communicate with the longitudinal channels. By way of

connection of the longitudinal channels to the connection of the vacuum pump a gas-tight connection between the vacuum pump and the sample vessels may be created. Advantageously with this the level of the exit opening is selected in a manner such that it lies above the level of the deepenings. In this manner there are formed obstacles which prevent a flowing back of condensed fluid into the sample vessels. With this a cross-contamination is avoided.

The connection plate may comprise a connection opening communicating with the collector channels, which is connected or connectable to the connection of the vacuum pump. The connection plate thus serves for connecting the connection of the vacuum pump to the various sample vessels. According to the size and number of the sample vessels there may be provided various holding devices (i.e. racks) and connection plates fitting therewith.

There results a particularly simple design when the collector channels are arranged on the upper side of the connection plate and are open to the top. The sealing results by placing on a sealing plate. Between the sealing plate and the connection plate furthermore along their edge there may be applied a seal.

The sealing plate is preferably manufactured of glass. For avoiding a premature condensation of the solvent on the sealing plate this or also the connection plate may be designed heatable.

The sealing plate and/or the connection plate may furthermore comprise aligning means for centering and firmly holding the connection plate with regard to the holding means.

The above described embodiment example of the connection means is particularly preferred. The connection of the vacuum pump may for example be connected to the connection openings on the connection plate or plates via one or more flexible tubings.

Of course also other connection means are conceivable. In place of deepenings arranged on the surface of the connection plate bores may be provided in the inside of a connection plate. In this case a sealing plate may be done away with.

Finally it is also conceivable to connect each of the sample vessels directly via a tubing to a vacuum pump.

Advantageously the holding means and/or the connection means are adaptable to a various number and size of sample vessels. In particular the holding means and/or the connection means may be exchanged according to the size and the number of the applied sample vessels.

In the method according to the invention for processing, in particular for evaporating samples held in sample vessels, preferably there is applied a device as previously described. The samples in the sample vessels are advantageously heated and the sample vessels simultaneously moved. The sample vessels are evacuated individually or in groups. With this the pressure outside the sample vessel is not changed, remaining typically at the surrounding pressure.

The invention is described in more detail in embodiment examples and by way of the drawings. There are shown in:

Figure 1 a schematic representation of a device according to the invention,

Figure 2 a schematic representation of an alternative embodiment example with a reduced number of sample vessels,

Figure 3 a perspective representation of the connection means and the holding means in an exploded representation,

Figure 4 a perspective representation of the connection plate placed sealingly onto the sample vessels,

Figure 5 a plan view of one embodiment example of a connection plate,

Figure 6 a cross section through the connection plate according to Figure 5,

Figure 7 a schematic representation of the whole device and

Figure 8 a schematic representation of the drive device.

In Figure 1 there are shown the components of a device 1 for evaporating samples which are essential to the invention. The device 1 consists essentially of a housing 29. In the housing 29 there are provided holding means in the form of a rack 2. Into the rack 2 there may be inserted sample vessels 20. The rack is typically manufactured of aluminium. The sample vessels 20 consist typically of glass tubelets or plastic tubelets closed to the bottom.

The rack 2 is placed onto a heating plate 3 (hidden in Figure 1), by which means the sample located in the sample vessels 20 may be heated. The heating plate may be set into motion via a

motor 22 so that in the sample vessels there is produced a vortex movement of the sample.

For reducing the boiling point of the solvent of the probe, in the inside of the sample vessels 20 there is produced a vacuum.

For this there is provided a connection plate 6 which may be sealingly placed onto the filling opening 21 of the sample vessels 20. In the connection plate 6 (see Figures 3 and 4) there are provided connection channels (longitudinal channels 10, deepenings 11). Via the connection channels and a flexible tubing 7 the inside of the sample vessels 20 are connected or connectable to a vacuum pump 4 not shown in Figure 1. The tubing 7 is firstly led into a condenser where the evaporated solvent is condensed (likewise not shown in Figure 1).

In Figure 1 there is shown an embodiment example in which there are provided two connection plates 6. The rack serves for receiving eight times twelve sample vessels. Each one connection plate is placeable onto 48 sample vessels 20.

The device is furthermore provided with a pivotable cover 25 which may be closed for protection during operation.

Figure 2 shows the device 1 according to Figure 1 with a rack 2 and with a connection plate 6 which is adapted to a smaller number of larger sample vessels. In Figure 2 there are shown six sample vessels 20. The sample vessels 20 are sealingly connected to the vacuum pump via a connection plate 6 and for example via three connection tubings 7.

Otherwise the embodiment example according to Figure 2 corresponds to the example according to Figure 1.

Figure 3 shows in an exploded representation schematically the rack 2 and the connection means consisting of the connection plate 6 and of a sealing plate 8.

The rack 2 is formed of a block of aluminium in which there are provided cylindrical holes for receiving the sample vessels.

Onto the sample vessels 22 applied into the holes 31 there may be sealingly placed the connection plate 6. The connection plate 6 is provided with longitudinal channels 10 which extend from the lower side 14 able to face the sample vessels through the connection plate 6. The arrangement and the number of the longitudinal channels 10 is selected such that these may be placed aligned onto the filling openings 21 of the sample vessels 21.

On the upper side 13 of the connection plate 6 there are arranged collector channels in the form of deepenings 11. The deepenings 11 extend from the longitudinal channels 10 and connect these to one another and to a connection opening 9 represented dashed. The connection opening 9 is connectable to the vacuum pump 4 (see the representation in Figure 7).

Onto the upper side 13 of the connection plate 6 there may be sealingly placed on a sealing plate 8. With this all deepenings 11 are sealed towards the top and form collector channels.

The sealing plate 8 is furthermore provided with openings 15 which are aligned with corresponding openings in the connection plate 6 and which serve for aligning and fastening the sealing plate 8 and the connection plate 6 with respect to the rack 2.

In Figure 4 there is shown the connection plate 6 which is sealingly suctioned onto the filling openings 21 of the sample vessels 20. The sealing plate 8 is placed onto the upper side 13 of the connection plate 6.

The sealing plate 8 is furthermore provided with non-shown heating means, for example heating wires or a steamed-on metal layer, which serve for preventing a condensation of the evaporated solvent on the inner side of the sealing plate.

The connection plate 6 is typically manufactured of layered aluminium. The sealing plate 8 consists of glass.

In Figure 5 there is shown a plan view of the connection plate 6. The longitudinal channels 10 extend from the lower side 14 transversely through the connection plate 6 up to its upper side 13. Deepenings 11 connect the longitudinal channels 10 to one another and to the connection opening 9.

In Figure 6 there is shown a cross section through the sealing plate 6. On the lower side 14 as an extension of the longitudinal channels 10 there are arranged in alignment sealing means 16 which permit the sealing pressing of the sealing plate 6 onto the filling openings 21 of the sample vessels 20.

The sealing means 16 are typically formed out of foam-material-like washer 39 or plates. These may be simply changed after a working procedure which eliminates the contamination danger via the seals. The washer 39 or plates are typically placed on a peg 38 which is provided with a bore and which is screwed into the longitudinal channels 10. The washer 39 or the plates may consist of foamed polyethylene. The longitudinal channels 10 end in an exit opening 34. The level 35 of the exit opening lies above

the level 36 of the base of the deepening 11. Thanks to the obstacle formed in this manner the backflow of condensate is avoided. It would however also be conceivable to provide other forms of obstacles, e.g. a projecting bulge.

In Figure 7 there is schematically shown the whole device 1 which consists of the housing 29, the condenser 17 and of a vacuum pump 4. The connection plate 6 is connected via a tubing 7 to a condenser 17. In the condenser 17 the evaporated solvent is condensed and collected in a collector flask. The condenser 17 is connected to a connection 5 of a vacuum pump 4.

Figure 8 shows schematically the drive of the rack which consists essentially of a motor 22 which via a belt drives an eccentric 24. The eccentric moves the heating plate 3 onto which the rack 2 is placed.

The eccentric 24 is furthermore simply adjustable so that the eccentricity e and thus the degree of eccentric movement, i.e. the size of the produced swirl is settable. Likewise also a balance weight 26 may be provided. The balance weight 26 may be adjustable in order to permit an optimal vibration operation. Adjustability may for example be produced in that the distance of the balance weight to the rotational axis is adjustable, e.g. via a thread.

Patent claims

1. A device (1) for processing, in particular evaporating samples in sample vessels (20) provided with at least one filling opening (21),

with holding means (2) for holding several sample vessels (20),

with optional heating means (3) for heating the samples contained in the sample vessels (20),

and with means (4) for producing a vacuum,

characterised in that the device (1) comprises connection means (6, 7, 8) connectable to the filling openings, by way of which the sample vessels (20) individually or in groups are gas-tightly connectable to a connection (5) of the means (4) for producing a vacuum and by way of this may be evacuated.

2. A device according to claim 1, characterised in that the device (1) comprises drive means (22, 23, 24) for producing a vortex movement, and that the connection means (6, 7, 8) are designed in a manner such that the holding means (2) and the sample vessels (20) are movable independently of the means for producing a vacuum, that in particular the connection means (6, 7, 8) comprise flexible components (7).
3. A device according to one of the claims 1 or 2, characterised in that the connection means comprise at least one connection plate (6) which is sealingly pressable onto the

filling openings (21) of the sample vessels (20), or is suctioned by the vacuum,

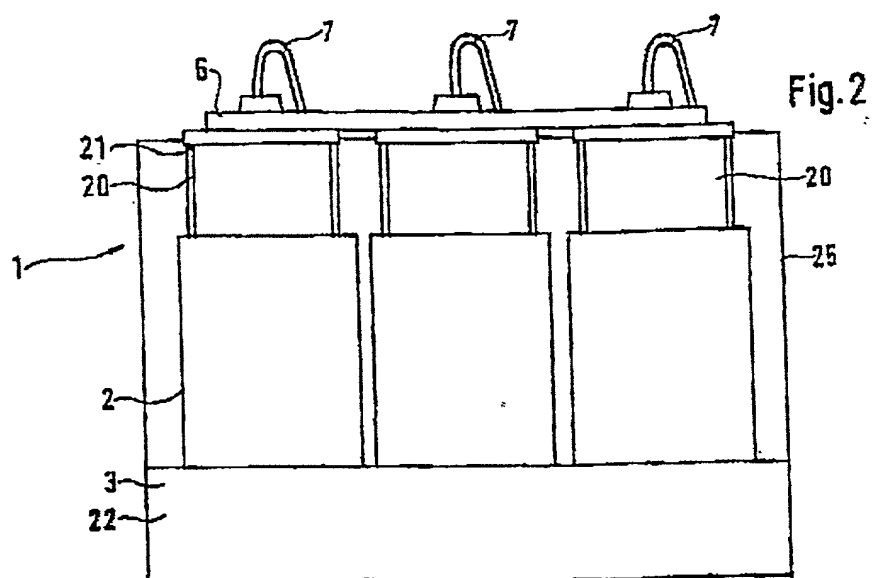
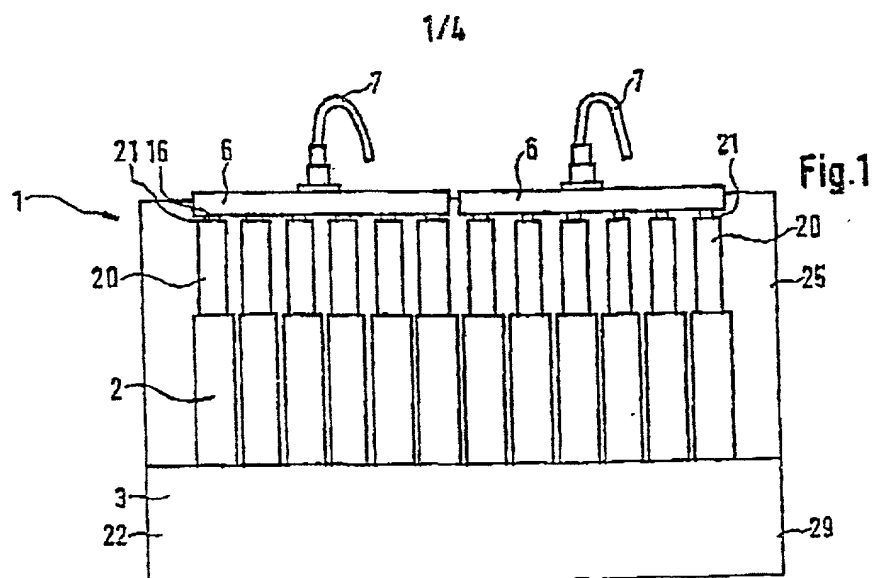
and which is provided with connection paths (10, 11) for connecting the filling openings (21) to the connection (5) of the means for producing a vacuum.

4. A device according to claim 3, characterised in that the connection plate (6) comprises longitudinal channels (10) which extend from the lower side, able to face the sample vessels (20), of the connection plate (6) and which are placeable aligned onto the filling openings (21).
5. A device according to claim 4, characterised in that the longitudinal channels (10) extend through the connection plate (5) up to the upper side (13) distant to the lower side (14), wherein the upper side is provided with at least one deepening (11) which communicates with the longitudinal channels (10).
6. A device according to claim 5, characterised in that between the exit opening (34) of the longitudinal channels (10) and the deepening (11) there are formed obstacles which prevent the flowing back of condensate into the sample vessels (20), that in particular the level of the exit opening lies above the level of the base of the deepening (11).
7. A device according to claim 6, characterised in that the connection plate (6) comprises a connection opening (9) which communicates with a deepening (11) and which is connectable or connected to the connection (5).
8. A device according to one of the claims 6 or 7, characterised in that the connection means comprise a sealing plate

(8) which for sealing the deepening (11) is placeable onto the connection plate (6).

9. A device according to claim 8, characterised in that the sealing plate (8) is designed heatable, and that the sealing plate (8) is manufactured of a transparent material, in particular of glass.
10. A device according to one of the claims 8 or 9, characterised in that the sealing plate (8) and/or the connection plate (6) comprise aligning means (15) for centering and firmly holding the connection plate (6) with respect to the holding means (2).
11. A device according to one of the claims 1 to 10, characterised in that the holding means (2) and/or the connection means (6, 7, 8) are adaptable to a differing number and size of sample vessels (20), in particular are exchangeable.
12. A method for processing, in particular for evaporating samples held in several sample vessels (20), in particular with a device (1) according to one of the claims 1 to 11,

in which method the samples are heated in the sample vessels (20) and in which the sample vessels (20) are preferably moved, characterised in that the filling openings of the sample vessels (20) individually or in groups are gas-tightly connected to means for producing a vacuum, and with this are evacuated.



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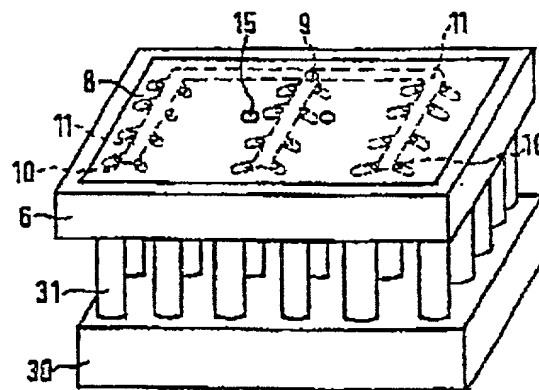
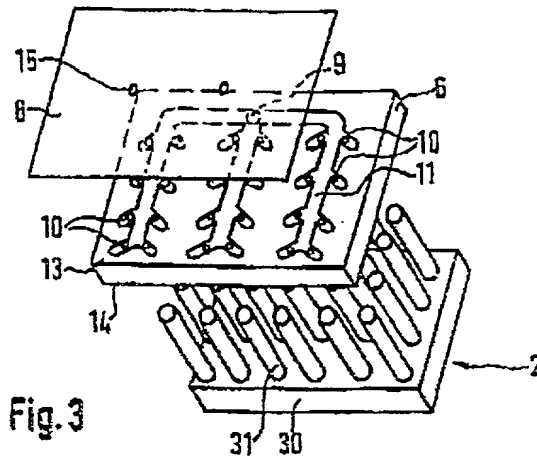
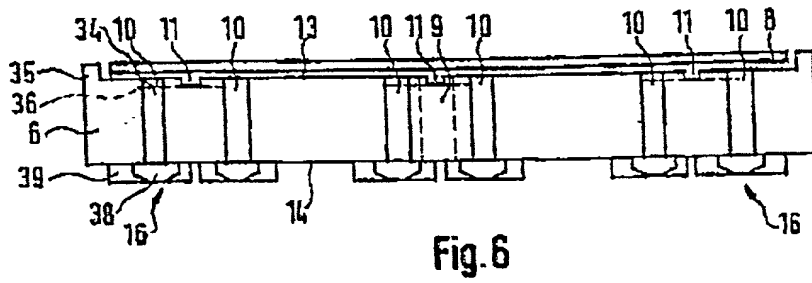
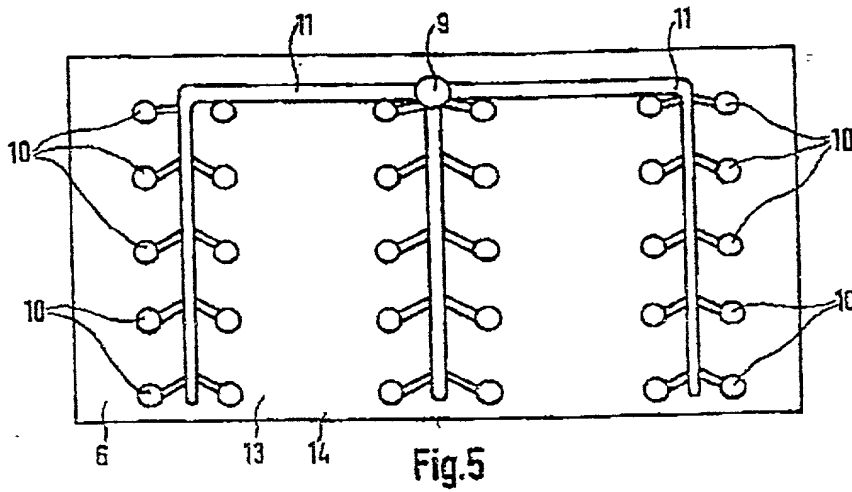
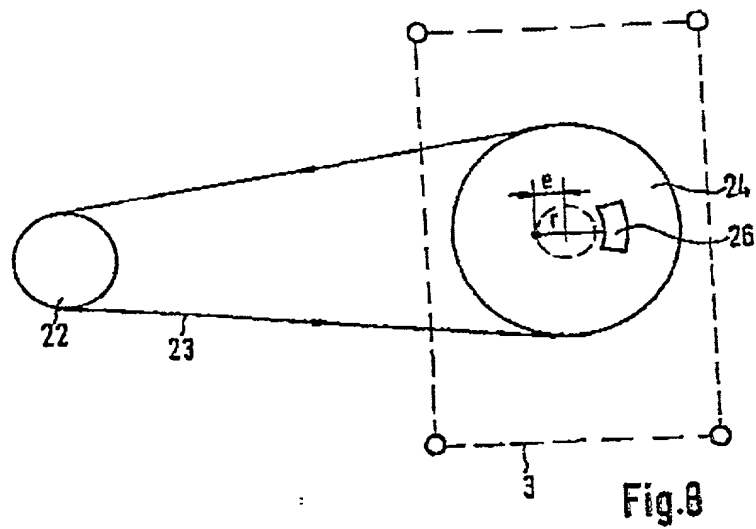
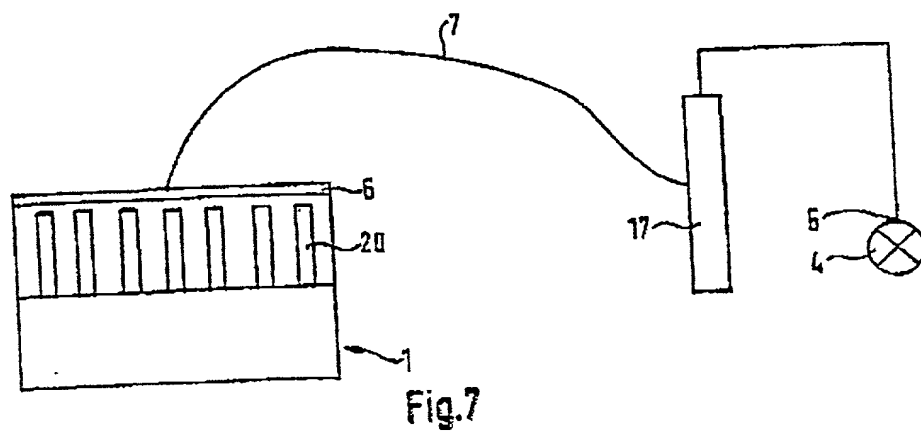


Fig.4

3/4



4/4





Attorney's Docket No. _____

- ☐ Original Application
☒ PCT National Application—U.S. Designated Office
☐ Continuation-in-Part Application

COMBINED DECLARATION, PETITION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

A device and a method for processing samples

☐ the specification of which

☐ is attached hereto.

☐ was filed on _____ as

Application Serial No. _____

and was amended on _____

(if applicable)

☒ which is described in international application no. PCT/EP00/00653 filed 28 January 2000

and as amended on _____ (if any), which I have reviewed and for which I solicit a United States patent.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I do not know and do not believe that the same was ever known or used in the United States before my or our invention thereof or patented or described in any printed publication in any country before my or our invention thereof more than one year prior to this application or said international application, that the same was not in public use or on sale in the United States of America more than one year prior to this application or said international application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application or said international application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application or said international application and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application or said international application by me or my legal representatives or assigns except as identified below.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Number	Country	Date of Filing (day, month, year)	Priority Claimed
99 810 109.1	EP	Feb 10, 1999	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no
			<input type="checkbox"/> yes <input type="checkbox"/> no
			<input type="checkbox"/> yes <input type="checkbox"/> no
			<input type="checkbox"/> yes <input type="checkbox"/> no
			<input type="checkbox"/> yes <input type="checkbox"/> no

Various embodiments

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorneys and/or agents to prosecute this application and transact all business in the United States Patent and Trademark Office connected therewith:

Jerry W. Berkstresser, Reg. No. 22,651; Paul V. Del Giudice, Reg. No. 28,788;

Allen P. Rosenberg, Reg. No. 24,946; and Charles W. Fallow, Reg. No. 28,946

Send correspondence to: SHOEMAKER AND MATTARE, LTD., Suite 1203 Crystal Plaza Bldg. 1, 2001 Jefferson Davis Highway, P.O. Box 2286, Arlington, Virginia 22202-0286

Direct telephone calls to: Jerry W. Berkstresser, Paul V. Del Giudice, Allen P. Rosenberg, or Charles W. Fallow at (703) 521-5210

I hereby petition for grant of a United States Letters Patent on this invention.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

1. FULL NAME OF SOLE OR FIRST INVENTOR <u>Freydl, Ernst</u>		INVENTOR'S SIGNATURE <i>E. Freydl</i>	DATE <u>Aug 10, 2001</u>
RESIDENCE <u>Switzerland</u>		CITIZENSHIP <u>Swiss</u>	
POST OFFICE ADDRESS <u>Herbrigstrasse 67, CH-9011 St. Gallen</u> <i>CHX</i>			
2. FULL NAME OF SECOND JOINT INVENTOR, IF ANY <u>Tauer, Andreas</u>		INVENTOR'S SIGNATURE <i>A. Tauer</i>	DATE <u>Aug 10, 2001</u>
RESIDENCE <u>Switzerland</u>		CITIZENSHIP <u>Swiss</u>	
POST OFFICE ADDRESS <u>Limmattalstrasse 63, CH-8040 Zurich</u> <i>CHX</i>			
3. FULL NAME OF THIRD JOINT INVENTOR, IF ANY <u>Ziolko, Thomas</u>		INVENTOR'S SIGNATURE <i>T. Ziolko</i>	DATE <u>Aug 10, 2001</u>
RESIDENCE <u>Switzerland</u>		CITIZENSHIP <u>Swiss</u>	
POST OFFICE ADDRESS <u>Esserwil, CH-9325 Roggwil</u> <i>CHX</i>			
4. FULL NAME OF FOURTH JOINT INVENTOR, IF ANY		INVENTOR'S SIGNATURE	DATE
RESIDENCE		CITIZENSHIP	
POST OFFICE ADDRESS			